PATENT CLAIMS

1. High-power press pack semiconductor module (1) comprising

   - an electrically conducting base plate (4);
   - at least one electrically conducting top plate (3);
   - at least one semiconductor chip (2) including semiconductor material, a first main electrode that makes contact with the base plate forming a plane interface and a second main electrode that makes contact with the top plate,
   - a housing (11, 12, 13) containing the base plate, top plate and semiconductor chip,

   wherein a material is provided adjacent at least one of said first or second main electrodes that, together with the semiconductor material forms an eutectic alloy or an alloy whose melting point is below that of the semiconductor material,

   characterized in, that

   - at least one of said base plate (4) or top plate (3) is made of metal matrix composite material comprising of two-dimensional randomly distributed short cut graphite fibers in the plane of the interface in an Al or Ag matrix, whose coefficient of thermal expansion is close to that of the semiconductor material, said metal matrix composite material containing said alloy-forming material.

2. Module as claimed in Claim 1, characterized in, that

   - said base plate (4) and top plate (3) are made of the same metal matrix composite material.

3. Module as claimed in Claim 1, characterized in, that

   - said metal matrix composite material has a metal content of at least 25 percent by volume.

4. Module as claimed in Claim 3, characterized in, that

   - said metal matrix composite material comprises a metallic matrix alloy with a semiconductor material.

5. Module as claimed in Claim 4, characterized in, that

   - said metallic matrix alloy has a semiconductor material content up to the semiconductor material content of an eutectic composition.

6. Module as claimed in Claim 5, characterized in, that

   - said matrix comprises Ag, Al, Au or Cu with a Si content of at most 13 percent.

7. Module as claimed in Claim 4, characterized in, that

   - said metallic matrix alloy has a semiconductor material content that is tailored depending on the thickness of the semiconductor material such that the hotspot alloy is in the eutectic range without bulk precipitation.

8. Module as claimed in Claim 1, characterized in, that

   - said at least one plate of a metal matrix composite material (3, 4) has a thickness of at least the thickness of the semiconductor material.

9. Module as claimed in Claim 1, characterized in, that

   - said base plate (4) and said top plate (3) are both made of metal matrix composite material, and

   - said plates (3, 4) have a combined thickness of at least the thickness of the semiconductor material.